OXCART Progress Report #3

OXC-0145
COPY 2 OF 3

30 November 1959

25X1A9a [redacted] cy SENT TO CONTRACTS for their retention - 4 Dec 59.

Dear Dick:

PROGRESS REPORT #3

It seems only yesterday that I wrote a rather lengthy progress report, on which we still have a number of items of action pending. November has gone by very rapidly, but I think we have made considerable progress.

25X1A 1. AR Tests. You are getting daily progress reports from the [redacted] on the status of the AR tests. I think a fine job has been done by all in getting the base ready and the model up and tests underway. We do not have any conclusive data to present at this time as to the outcome of the S-band tests, but 25X1A9a these are in work. I have not heard from [redacted] but the tests which have been undertaken in Florida appear to be very interesting in providing a solution to one of our major problems -- that of the rear aspect of the aircraft. I expect to see Frank December 1st and talk over the necessity or desirability of asking for the F-94C for pole tests to either supplement or confirm what has been learned down in Florida.

Other progress during the month of November on the AR front has been mainly the indication in the box tests that we can load fiberglass honeycomb as effectively as we can the plastic foam. This is an important step 25X1A5a1 in a solution to the structural and high temperature problem. We have asked [redacted] for bids on half a dozen plastic leading edge models to our design, and they have been very cooperative in working with us on various materials. 25X1A9a [redacted] has arranged for visits to a number of eastern plastic manufacturers, as well as [redacted] to determine the latest status of useable materials.

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This month, three engineers from [redacted] have joined us to work on electronic problems. One of these gentlemen is spending his entire time on the problems of ferrites; another is working on problems of testing in the box; while a third is being cleared to go to the [redacted] As of the first of 25X1A December, we will have another [redacted] engineer, who can also go to the [redacted] 25X1A to bolster up our crew at that point. 25X1A5a1

The 1/8 scale model has been brought up to the latest aerodynamic configuration and is available for tests on the bag. The 10 foot fuselage section is available for tests on the large pole, and about half of the eight different configurations of chines are available for tests. In order to save confusion and speed up testing at the [redacted] it is desirable to be able to 25X1A fly the 1/8 scale model, various sections of the full scale model, and the 10 foot fuselage from the [redacted] to Burbank and return. I would recommend 25X1A a C-130B be assigned to this program for transportation of material and personnel in the very near future.

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25X1A While complete calibrations and smooth operation of the test gear are not yet available at the [redacted] [redacted] have done an excellent job in getting into operation so fast.

2. Over-All Design. Work has progressed on design of the nose section and equipment bay model. Tooling has been started for this section of the aircraft. Material will arrive about the middle of December. It has been necessary to spend much effort in redesign of the equipment bay, in order to design for the principle of being able to use either a pressurized or non-pressurized bay, as we promised in the 2 November meeting.

Intensive study has continued with the landing gear, wheel and brake vendors, in order to get optimum running gear. Water-cooled brakes are being investigated, in the interest of weight saving. Main landing gear tire size has been given a great deal of study, in connection with runway loadings and takeoff speeds. The gear design criteria have been established and detail design is proceeding.

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25X1A5a1 [redacted] our specialist on titanium, visited [redacted] Company to tie down problems of material process control, inspection, heat treat requirements, availability and costs. It appears that a decrease in cost will result when we place a substantial order with them. This decrease, however, will be very largely compensated for by extreme cost increases in other elements of the aircraft.

As an instance of the above, high temperature bearings for control surfaces are being quoted to us at costs 20 to 40 times those of normal aircraft bearings, which are expensive to start with. Hydraulic fluid will be very expensive. One type of "fluid" which we ordered came to us in a canvas sack as a white powder. We were told that this would become a fluid at something over 200°F! Obviously, this advanced material is not satisfactory for the aircraft. Other petroleum types are on order, but it seems that 550°F should be the planning figure for maximum hydraulic temperature, in the early stages of the project, at least. This imposes a considerable cooling load on our fuel oil heat exchanger, but it is not out of order at this time. Two high temperature hydraulic pumps developed for the B-70 have been ordered. The capacity of these pumps appears to be slightly marginal for operation of the nose spike on the nacelle, and efforts are being made to reduce this requirement, as we do not want to undertake an expensive high temperature pump development.

Basic structural design proceeds on all fronts.

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We have been asked [redacted] and we agree, to furnish an actual augmentor design for static running in Florida (costs to be determined shortly). I am very concerned that there may be major design problems

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on this element, which we initially expected to get from [redacted] now apparently will have to design ourselves, with their assistance. Many of the design features were agreed upon with them in a meeting between LAC [redacted] personnel this month, but basic questions that we asked them regarding probability of flutter of the free floating tail flaps and structural design features of the augmentor itself have not been investigated [redacted] except on very small model scale. I expect a great deal of trouble with the augmentor qualification tests.

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3. Wind Tunnel Tests. The low speed tunnel tests have been satisfactorily completed, with only minor modifications to the configuration required. The high speed model was completed and is currently enroute to Ames for tests in the NASA unitary wind tunnel.

4. Expenditures. Expenditures to date are shown on the attached curve. There are no problems in this region to this point. We are preparing estimates of certain capital equipment which we will request shortly. These include a pit installation, enabling us to test the full scale aircraft fuel system. (Costs for the model and tests, but not for the additional facility required to do this, are included in the basic cost quote.) The tests will be conducted in a revetment previously used for testing with hydrogen fuel on the CL-400 design. This pit is 25 feet deep and about 70 feet long, and is required in order to tilt the fuel system to flight angles of at least 30°, to assure the ability to feed fuel from all tanks as required. If the model were mounted without the pit, it would stick up very much above the revetment height. The pit also serves as a container for fuel, should the tanks burst during high altitude testing, when the tanks are under compression and being loaded in an unusual manner. With a fuel capacity of over 10,000 gallons, we must take precautions for not allowing the fuel to run all over around the revetment, should a tank burst.

Another piece of capital equipment peculiar to this program is a building approximately 20 x 50 feet, insulated by special materials and provided with heaters, so that the complete forebody of the airplane can be put in and tested at temperatures on up to at least 800°F. This same building would serve for tests of the hydraulic system and the electrical system mounted on portable frames. I do not know the combined cost of these two units at this time, but it is somewhere in the $50,000 to $60,000 region for the two together.

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5. Security. [redacted] visited the area, and security briefings to LAC management have been completed. No outstanding problems exist, except that there is a great deal of work in the offing

to clear a sufficient number of people for the project as it gathers momentum.

6. Other Problems Requiring Decisions. Only those outlined in my previous letter. In general, things are proceeding quite smoothly.

cc: Gene
John